AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions of claims in the application.

Listing of Claims:

1. (Original): A system that facilitates non-invasive in-line characterization of parameters of VLSI circuit interconnects, comprising:

a plurality of micro-electro-mechanical system (MEMS) cantilevers that apply voltage(s) to VLSI circuit interconnect(s) without physical contact thereto;

a measuring component that measures deflection characteristics of the cantilevers, the deflection(s) correspond to electrical forces generated from the applied voltage(s) as passed through VLSI circuit interconnect(s); and

a component that computes characteristics of the VLSI interconnect based at least in part upon the measured deflection characteristics.

2. (Original): The system of claim 1, further comprising a control component that effectuates control of a VLSI circuit fabrication process step based at least in part upon the computed characteristics.

3. (Currently amended): The system of claim 2, ~~wherein~~ the computed characteristics are employed as feedback information to the control component.

4. (Currently amended): The system of claim 2, ~~wherein~~ the computed characteristics are employed as feed-forward information to the control component.

5. (Currently amended): The system of claim 1, ~~wherein~~ the MEMS cantilevers comprise conductive tips to effectuate injection of voltages into the VLSI circuit interconnects.

6. (Currently amended): The system of claim 5, ~~wherein~~ the MEMS cantilevers act as a conductive path to the conductive tips.

7. (Currently amended): The system of claim 5, ~~wherein~~ a conductive path is provided on the MEMS cantilevers to the conductive tips to facilitate injection of currents ~~voltages~~ into the VLSI circuit interconnects.

8. (Original): The system of claim 1, further comprising test structures for capacitance and/or resistance measurement.

9. (Original): The system of claim 1, further comprising a voltage source that delivers voltages to the MEMS cantilevers, the voltage source delivering disparate voltages to disparate MEMS cantilevers.

10. (Currently amended): The system of claim 1, ~~wherein~~ the measuring component comprising a photo-detector that detects a laser beam deflecting off at least one MEMS cantilever.

11. (Currently amended): The system of claim 1, ~~wherein~~ the measuring component comprises an optical interferometer.

12. (Original): The system of claim 1, further comprising a positioning component that facilitates proper positioning of the MEMS cantilevers with respect to the VLSI circuit interconnects.

13. (Original): The system of claim 12, the position components being scanners.

14. (Original): The system of claim 1, further comprising a pre-amplifier.

15. (Original): The system of claim 1, further comprising an amplifier.

16. (Currently amended): The system of claim 1, further comprising a tuning fork, ~~wherein~~ at least one MEMS cantilever is attached to the tuning fork.

17. (Currently amended): The system of claim ~~17~~16, ~~wherein~~ the tuning fork is a quartz tuning fork that can be at least one of self-sensing and self-actuating.

18. (Currently amended): The system of claim ~~17~~16, ~~wherein~~ an electrostatic shield is provided to shield a conductive path across the tuning fork to a conductive tip of the MEMS cantilever.

19. (Currently amended): The system of claim ~~17~~16, ~~wherein~~ a first leg of the MEMS cantilever is attached to a first prong of the tuning fork, and a second leg of the MEMS cantilever is attached to a second prong of the tuning fork.

20. (Currently amended): The system of claim 1, ~~wherein~~ at least one MEMS cantilever is a piezo-resistive cantilever.

21. (Currently amended): The system of claim 1, employed to measure coupling capacitance between VLSI circuit interconnects.

22. (Currently amended): The system of claim 1, employed to measure capacitance between at least one VLSI circuit interconnect and a ground plane.

23. (Currently amended): The system of claim 1, ~~wherein~~ the MEMS cantilevers and the VLSI circuit interconnects are within a vacuum chamber.

24. (Currently amended): The system of claim 1, utilized to characterize at least one of resistance and capacitance of a transistor.

25. (Currently amended): The system of claim 1, ~~wherein~~ a distance between VLSI circuit interconnects is less than 0.2 μm.

26. (Currently amended): The system of claim 1, ~~wherein~~ a length of VLSI circuit interconnects is less than 10 μm.

27. (Currently amended): The system of claim 1, ~~wherein~~ at least a portion of a first VLSI circuit interconnect to be tested is on a disparate layer compared to a second VLSI circuit interconnect to be tested.

28. (Currently amended): The system of claim 1, ~~wherein~~ the VLSI circuit interconnects are covered by a layer of dielectric.

29. (Original): A system that facilitates characterization of VLSI circuit interconnects, comprising:

a voltage source that outputs a plurality of disparate voltages;

two or more micro-electro-mechanical system (MEMS) cantilevers that receive the voltages output by the voltage source and apply the voltage(s) to VLSI circuit interconnect(s), wherein a first MEMS cantilever contacts a first VLSI interconnect and a second MEMS cantilever does not physically contact a VLSI interconnect;

a measuring component that measures deflection characteristics of the cantilevers, the deflection(s) correspond to electrical forces generated from the applied voltage(s) as passed through VLSI circuit interconnect(s); and

a component that computes characteristics of the VLSI interconnect based at least in part upon the measured deflection characteristics.

30. (Currently amended): The system of claim 29~~-30~~, ~~wherein~~ the computing component calculates a coupling capacitance between VLSI circuit interconnects based at least in part upon the measured deflection characteristics.

31. (Currently amended): The system of claim 29~~-30~~, ~~wherein~~ the computing component calculates a capacitance of a VLSI circuit interconnect that is not contacted by the first MEMS cantilever with respect to ground.

32. (Original): A method that facilitates measurement of various parameters of VLSI circuit interconnects, comprising:

positioning at least two MEMS cantilevers with conductive tips in proximity to at least two adjacent VLSI circuit interconnects;

providing voltage(s) to the conductive tips;

injecting the current (s) into the VLSI circuit interconnects *via* the conductive tips;

measuring oscillations resultant in the MEMS cantilevers; and

computing capacitance related to the VLSI circuit interconnects based at least in part upon the measured oscillations.

33. (Currently amended): The method of claim 32~~33~~, further comprising computing coupling capacitance between the two adjacent VLSI circuit interconnects based at least in part upon the measured oscillations.

34. (Currently amended): The method of claim 32~~33~~, further comprising computing capacitance of at least one MEMS cantilever with respect to a ground plane in a substrate.

35. (Currently amended): The method of claim 32~~33~~, further comprising:

providing a first voltage to a first MEMS cantilever with a frequency substantially similar to one half of at least one of a natural resonant frequency and a user-selected frequency of the first MEMS cantilever; and

grounding a second MEMS cantilever.

36. (Currently amended): The method of claim 32~~33~~, further comprising:

providing a first voltage to a first MEMS cantilever with a frequency substantially similar to one half of at least one of a natural resonant frequency and a user-selected frequency of a second MEMS cantilever; and

grounding the second MEMS cantilever.

37. (Currently amended): The method of claim 3233, further comprising:

providing a first voltage to a first MEMS cantilever with a frequency substantially similar to bf_{res6}, ~~wherein~~ where b is a constant such that $b \geq 1.3$ and resonance frequency (f_{res6}) [[f_{res6}]] is substantially similar to one half of at least one of a resonant frequency and a user-selected frequency of a second MEMS cantilever; and

providing a second voltage to the second MEMS cantilever with a frequency substantially similar to $f_{res5}(1+ab)$, ~~wherein~~ where a resonance frequency(f_{res5}) [[f_{res5}]] is substantially similar to half a resonant frequency of the first MEMS cantilever and a is substantially similar to f_{res5}/f_{res6}.

38. (Currently amended): The method of claim 3233, further comprising:

providing a first voltage to a first MEMS cantilever with a frequency substantially similar to bf_{res6}, ~~wherein~~ where b is a constant such that b [[b]] ≥ 1.3 and resonance frequency (f_{res6}) [[f_{res6}]] is substantially similar to one half of at least one of a resonant frequency and a user-selected frequency of a second MEMS cantilever; and

providing a second voltage to the second MEMS cantilever with a frequency substantially similar to $f_{res6}(1 + ab)$, ~~wherein~~ where a [[a]] is substantially similar to f_{res5}/f_{res6}, and f_{res5} is substantially similar to one half of at least one of a resonant frequency and a user-selected frequency of the first MEMS cantilever.

39. (Currently amended): The method of claim 3233, further comprising:

providing a first voltage to a first MEMS cantilever with a frequency substantially similar to at least one of a resonant frequency and a user-selected frequency of the first MEMS cantilever; and

grounding a second MEMS cantilever.

40. (Currently amended): The method of claim 3233, further comprising:

providing a first voltage to a first MEMS cantilever with a frequency substantially similar to at least one of a resonant frequency and a user-selected frequency of a second MEMS cantilever; and

grounding the second MEMS cantilever.

41. (Currently amended): The method of claim 32 ~~33~~, further comprising controlling a VLSI circuit fabrication process based at least in part upon measured oscillations.

42. (Currently amended): The method of claim 32 ~~33~~ employed to characterize a transistor.

43. (Original): A system for characterizing of VLSI interconnect circuits, comprising:

means for positioning two or more MEMS cantilevers proximate to a pair of VLSI circuit interconnects without contact thereto;

means for injecting currents into the VLSI circuit interconnects *via* the MEMS cantilevers;

means for measuring oscillations on the MEMS cantilevers resulting from electrostatic forces generated upon injecting the currents; and

means for computing capacitance related to the VLSI circuit interconnects based at least in part upon the measured oscillations.

44. (Currently amended): The system of claim 43 [[44]], further comprising means for selectively injecting disparate currents into the VLSI circuit interconnects.

45. (Currently amended): The system of claim 44 [[45]], further comprising means for calculating capacitance based at least in part upon measured oscillations resulting from application of a plurality of disparate voltages.